

Physa niagarensis Lea.

Ancylus parallelus Haldeman.

Planorbis deflectus Say.

Planorbis campanulatus Say.

Galba galbana (Say).

Galba humilis rustica (Lea).

Comparisons between the faunas of the two localities would be without significance until more systematic collecting has been done. The list of species will doubtless be greatly extended by future research.

CONCERNING CYPRAEA EXANTHEMA, CERVUS AND CERVINETTA.

BY EUGENE W. PRESBREY.

C. exanthema, Lin., 1767; Gray, 1825; Reeve, 1844; Hinds, 1845; Adams, 1852; Roberts, 1885; Dall, 1903.

C. cervus, Lin., 1771; Lam., (*cervina*) 1822; Gray, 1825; Reeve (var. ex.), 1844; Adams, 1852; Roberts, 1885.

C. cervinetta, Kiener,—; Desh, 1844; Adams, 1852; Roberts, 1885. Reeves says *cervinetta* is var. of *cervus*. Adams speaks of *cervina*, which was Lamarck's name for *cervus*, as distinct from *cervus*. Gray names var. a, and b, of *exanthema*. Roberts says *cervinetta* is a var. of *exanthema*.

For habitat, Roberts give *cervus* to Panama and West Coast of America. Dr. Dall properly locates *exanthema* from Hatteras to Darien, but he does not mention *cervus* either as a variety or as being found on the Florida east coast. Reeve and Sowerby located *cervus* in the East Indies. Adams said Polynesian Province.

The majority of monographers have distinguished *cervus* from *exanthema*, but none seems to have found a home for it. Nor are the other two definitely placed. Roberts is nearest to the facts.

For three years past the writer has had favorable opportunities for the study of these species in their natural habitat and may, perhaps, presume to record some facts that have forced themselves upon him.

Cypraea exanthema is found from Hatteras to Darien, but in greatest numbers and perfection of development around the Florida keys. They are born in the deep water. When an inch or so in

length, (bullaform) they come up to the mangrove roots that fringe the coral islands. These islands, or keys, are half surrounded, on the sheltered side, by clear channels two or three feet deep. These channels have free communication with the sea. The favorite food for *exanthema* is washed in from the live coral beds by every tide. The mangroves furnish shelter and coloring matter for the shell-*Exanthema*, unless disturbed does not leave the mangroves till ready to breed, when it goes to deeper waters. *Cypraea exanthema* is elongated, cylindrical, with tapering extremities, anterior aperture narrow and not depressed. The head and neck of animals is small, not often extended, because food comes to it. Sides of shell profusely decorated with *ring spots*, particularly near the base. Spots white with dark centers. The mantles, in young shells are purple black, studded with pustules that project flexible papillæ. These papillæ may be extended or withdrawn entirely into the pustule. The pustules become transparent lenses as the shell approaches adult form. The papillæ remain black and receive color through a circulation duct that is easily visible to the naked eye, particularly where it crosses the lens to the papilla. The lenses form the spots and the papillæ form the central dots. These papillæ are loaded with color and probably deposit all the color needed for decoration of the outer shell. The inner mucous membrane supplies the enamel. The papillæ near the outer edge of mantle soon lose the color bearing faculty, or, lacking supply, produce only nebulous white spots near the top of the shell. These papillæ possess a highly sensitive, independent, nerve ganglia. If one be touched, however delicately, it will instantly be withdrawn. The others will not be disturbed.

Color of shell, fugitive purple that turns to shades of brown upon exposure to light. Length of shell three to four inches, altitude about one-third the length.

C. exanthema is found on both sides of the Gulf Stream which is a thousand feet deep between Florida and the Bahamas, with a current of five or more miles an hour. Bahama, Jamaica and Colon specimens are coarser in texture, the spots are less frequent, form less regular and the color much paler. Less food and fewer mangroves. The true *exanthema* is not found on the Florida west coast.

CYPRAEA CERVUS. The most favorable habitat of this shell is

along the Florida west coast, in thirty to fifty feet of water, where it attains fullest growth. But it is also found from Key West to Miami, perhaps farther north, on the east coast. These specimens, sharing *exanthema's* habitat, show some reasonable variation from the west coast specimens, chiefly, however, in coloring.

The shell of *cervus* is not cylindrical, it is dome shape, inflated, swollen, with a rounded fullness of body extending to extremities. Anterior opening large, three times as large as *exanthema*, other dimensions being equal. The anterior opening is not depressed. The larger head and neck of *cervus* is always out in search of food which it prefers to seek in the open waters. It is a constant traveler and must have room for easy manipulation of head and foot.

Mantles of *cervus*, when young, are steely grey. Pustules and papillæ, shorter than *exanthema*, are milky white and remain so. *There are no color ducts.* There seems to be an absence of nerve ganglia; the papillæ are not sensitive. Spots more numerous and solid white, sometimes confused. The mantle-guides (not "teeth!") are usually irregular in *cervus*. Color, pale brown to ashy grey, on West Coast, where it never goes to mangroves. On East Coast it takes on *exanthema* coloring and the anterior opening is slightly smaller. Exertion for food is not necessary. Length, four to seven inches. Altitude, two to four inches.

Cypraea cervus is not found on the West Coast of America. It is not found at Panama. The writer has yet to find a specimen below Key West. Its natural habitat is West Coast of Florida.

Cypraea cervinetta has many of the characteristics of the other two. It is found under rocks at extreme low tide, near coral patches. It finds a fair substitute for mangrove bark from which to extract coloring matter of a purple tone that does not turn to *exanthema* brown. Shell subcylindrical, with straight sides and flattened curves. Anterior opening widened, as in *cervus*, but with cup-like depression around the opening. It has the activity of *cervus* and seeks its own food, which is scarce in its habitat. Like *cervus*, it must have free room for movement. The mantles have the distinguishing features of *cervus* and *exanthema*. Ring spots and solid white ones appear at random on the same shell. *Cervinetta* never attains the size of *exanthema*. Many specimens are fully matured when only one inch long. Color, silver grey purple. Length, one to three inches. Altitude, three-eighths to one inch.

Cervinetta, apparently, belongs exclusively to Panama Province.

The writer has a theory. It is that *cervinetta* is the closest survivor of the original type, that before the Isthmus was formed the habitat of *cervinetta* was both East and West. After the Isthmus became a barrier between the oceans the Gulf Stream currents were turned up the East Coast. These currents carried *cervinetta* northward where it found no volcanic disturbance, better food and environment, and *cervus* and *exanthema* were evolved from *cervinetta*.

But I wish somebody would say why all *Cypraea*, in Florida, are called "micramocks."

UROCOPTIS (ARANGIA) SOWERBYANA (PFR.)—A NOTE ON ITS RADULA.

BY CHAS. T. RAMSDEN.

Being very much interested in procuring specimens of this shell, I took a trip to its habitat, with Drs. Carlos de la Torre, of the University of Havana, and Thomas Barbour, of the Museum of Comparative Zoölogy at Cambridge, Mass.

Unfortunately, although we had a hard ride up "Monte Libano," we did not reach the right locality; I, however, promised Dr. de la Torre that I would try again, further up the mountain, as we were both most anxious to procure living specimens to study the radula, which was unknown to Pilsbry.

On March 13, 1913, I again went up the mountain for some twenty miles on horseback, over an infernal road, and upon turning over the first stone, I found, to my great delight, my first living specimen of *Arangia sowerbyana* (Pfr.). I at once concluded that it would be an easy matter to fill my pockets and the small box I had with me, with specimens, and felt sorry I had not brought along more boxes, to take a good supply. A five hours diligent search, however, in crevices, under and on rocks, brought to light some half dozen specimens. I was however satisfied, as we would now be able to know its radula.

Having sent a part of the catch to Dr. de la Torre for examination, he reports the following: The radula is like that of the Jamaican *Spirocoptis*, measuring ten millimeters in length, by one and one-half